

# Did Newborn Die From Mom's Marijuana Use?

## Diagnosis of exclusion leads to answer of... probably

- by Kate Kneisel, Contributing Writer, MedPage Today December 23, 2019

An 11-day-old white female neonate is brought to hospital shortly after being found unresponsive at home. Clinicians pronounce her dead. She is said to have been found face-up and on her back – thus there is no suspicion that the baby died of suffocation due to unsafe sleep position or conditions.

The infant was born at 36.5 weeks to a 20-year-old and seemed healthy at the time of delivery. Hospital clinicians order a complete autopsy and full investigation. The mother is thought to have a history of marijuana use.

Macroscopic examination notes extensive hemorrhage of both adrenals, petechial hemorrhage of the entire liver (Figure 1), and focal hemorrhage of the thymus. The infant has no X-ray evidence of any bone fractures or other trauma.

Newborn screening of inborn errors of metabolism, and post-mortem neo-nate blood toxicology test results are both negative. The newborn drug screen of umbilical cord homogenate reveals 528 pg/g carboxy-THC (screen cutoff at 50 pg/g). Microscopic examination shows extensive necrosis and hemorrhage of the liver and adrenals, and focal hemorrhage of the thymus.

### Case Follow-up

There is nothing unusual found on microscopic examination of the other major organs and no evidence of congenital disease or infection. The cause of death is extensive necrosis and hemorrhage of the liver and adrenals; the cause is considered to be marijuana toxicity, based on the mother's blood marijuana concentration and pattern of marijuana use prior to and during pregnancy (currently confidential due to legal circumstances).

### Discussion

Clinicians reporting this [case](#) of fatal marijuana toxicity in a neonate write that the growing use of marijuana and the near impossibility of conducting prospective case control studies during pregnancy make retrospective case reports such as this one vital to help clinicians identify acute marijuana toxicity in newborn health or death.

They add that the last 5 years have seen increasing hospital use of the newborn drug screen of umbilical cord homogenate.

Marijuana is one of the most widely available and used drugs across the world; its use at least once over a lifetime is reported by up to 4% of the global adult population, and by 11% of adults in the U.S.

As well, marijuana and its derivatives are increasingly used for therapeutic purposes, and have been evaluated for conditions including pain, anorexia, side effects of chemotherapy, multiple sclerosis, and muscle spasms.

Recently, case authors note, the therapeutic and health effects of cannabis and cannabinoids as studied in more than 24,000 articles and 10,700 abstracts were [reviewed by a National Academies of Sciences, Engineering, and Medicine](#) committee. It graded the support for therapeutic effects as follows:

*Conclusive evidence or substantial effect:*

- Chronic pain
- Chemotherapy-induced nausea and vomiting
- Multiple sclerosis-related spasticity

*Moderate evidence:*

- Sleep disturbance

*Limited evidence:*

- Appetite and weight gain
- Post-traumatic stress disorder
- Anxiety
- Tourette syndrome

*Insufficient evidence:*

- Cancer
- Epilepsy
- Neurodegenerative disorders
- Irritable bowel syndrome

While marijuana use has been implicated as an indirect cause of death due to motor-vehicle accidents, falls or other personal injuries, or suicidal behavior, this may be the first reported death directly caused by acute marijuana toxicity, reporting clinicians suggest.

There is no increased risk of human death caused by acute marijuana toxicity even for high levels of marijuana use compared to non-users, case authors write, and inconclusive evidence of its chronic effect on mental health, lung cancer, cardiorespiratory diseases, or cognitive impairment.

Given the growing popularity of marijuana in the U.S., authors see an urgent need to better understand the potential repercussions of marijuana use on maternal and fetal health during pregnancy.

With estimated rates of marijuana use during pregnancy from 2% to 11% of gravidae, current data are limited by self-reporting data collection, recall bias, and confounding risk factors. Research efforts are now focusing on identifying how marijuana may influence pregnancy outcomes.

Furthermore, only 6.7% of women with a positive umbilical cord homogenate for marijuana use actually reported using marijuana, according to a recent epidemiology study.

Many epidemiologic studies of [maternal marijuana use](#), adverse pregnancy outcomes, and neonatal morbidity return inconclusive results, in part due to difficulty in separating indirect maternal physical or mental effects on the fetus from direct toxicity of marijuana on the fetus or newborn neonate.

Thus, no explanations have been proposed regarding a mechanism of acute marijuana toxicity on fetal or neonatal death.

Authors note that the current social and cultural environment makes it almost impossible to conduct prospective case control studies on adverse effects of marijuana use on maternal and fetal health during pregnancy, and even animal experiments on this topic are difficult.

Data most relevant to human physiology is from a 1987 study on fetal disposition of marijuana during late pregnancy in the rhesus monkey. This research found that marijuana rapidly crosses the placenta and enters the fetus, where it is concentrated in the liver/bile, adrenals, and thymus, as compared to the placenta, plasma, spleen, testes, lungs, brain, and kidneys.

### **Diagnosis of exclusion**

The cause of death in this case was a "diagnosis of exclusion." The neonate was unremarkable at delivery, and no congenital, metabolic, or infectious disease or trauma were identified. Positive findings include necrosis and hemorrhage of the liver and adrenals, as well as focal hemorrhage of the thymus.

Case authors write that maternal high-dose marijuana use in late pregnancy was evident based on the presence of marijuana in the umbilical cord. As well, the observed necrosis and hemorrhage of the liver and adrenals are consistent with animal data that show the concentration of marijuana in the liver/bile and adrenals after rapidly crossing the placenta, they write.

In contrast, the thymus consists of mostly lymphoid tissues, which may resist necrosis and only show hemorrhage even with high-dose marijuana distribution.

This case is unique in that other possible causes of death can be eliminated – since there was no confounding evidence of substances other than marijuana in the umbilical cord, or congenital, metabolic, or infectious disease.

Investigation of an in utero fetal demise could be confounded by potential maternal or placental factors, even with positive findings of marijuana in the umbilical cord, authors observe. In most autopsies of still-born fetuses, the internal organs are autolyzed, and it is difficult for pathologists to identify necrosis in the liver and adrenals.

Clinicians reporting this case conclude that forensic pathologists have professional obligation to report these cases in peer-reviewed publications, to inform the public for their "informed decisions" about marijuana use.